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Non-surgical improvement of the upper airway for sleep disordered breathing: 5 year follow up

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In this study, we investigated changes in upper airway, to test the hypothesis that the upper airway can be non-surgically remodeled in adult patients with sleep disordered breathing. After obtaining informed consent, we undertook a 3D cone-beam (CBCT) scan of a 56-year-old male patient, who was diagnosed with mild obstructive sleep apnea by a sleep specialist. The patient was treated using an FDA approved, biomimetic oral device (DNA appliance®, Vivos BioTechnologies, Inc., USA). The active treatment time was 18 months approx. Volumetric 3D reconstruction of the upper airway from the CBCT scan was undertaken prior to treatment, and the patient was monitored with a follow up CBCT scan 5.5yrs later. The results showed that the upper airway volume increased from 13.9cm3 to 29.2cm3 and its minimum cross-sectional area increased from 67 mm2 to 477.5 mm2 with no device in the patient's mouth. In addition, the minimum distance of the inferior turbinate from the nasal septum increased on the right side from 1.1 mm to 2.5mm; and on the left side from 1.4mm to 2mm. Similarly, the surface area of the posterior nasal apertures at the level of the posterior nasal spine in the coronal plane increased from 487.5 mm2 to 569 mm2. The minimum transpalatal bone width also increased from 37 mm to 41.5mm, while the medio-lateral retropalatal airway width increased from 4.5 mm to 29 mm. We conclude that biomimetic oral appliance therapy may be able to non-surgically remodel the upper airway in adult patients diagnosed with sleep disordered breathing.

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